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MENTAL HEALTH FOR THE CHILDREN OF TO-MORROW

DELIA E. HOWE, M.D.

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MENTAL HEALTH FOR THE CHILDREN OF TO-MORROW

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TO ALL WHO SEEK THE HIGHEST INTERESTS OF OUR COUNTRY — HER HONOR AND UPLIFTING, AND THE RIGHTEOUSNESS OF HER SONS AND DAUGHTERS RATHER THAN HER MILITARY GLORY — I SEND GREETINGS IN THIS BOOK.

TO THOSE WHO BY COURAGE, STEADINESS OF PURPOSE, AND HIGH IDEALS DIRECT THE CURRENTS OF THEIR OWN LIVES AND THE DESTINY OF OUR RACE, I DEDICATE MY WORK AS A TRIBUTE OF RESPECT TO

"HIM THAT OVERCOMETH."

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Chapter I.

INTRODUCTION.

A DISTINGUISHED physician and specialist in nervous diseases, a man untainted by pessimism, but a keen observer and student of men, recently declared that he could think only with dread of the time when upon the children of to-day must fall the responsibility of directing our nation.

We who love the race and our fatherland cannot lightly dismiss, as mere melancholy harping, such opinions of such men. Patriotism urges us to see to it that strong hands with sound minds to direct them be made ready for the burdens of the next generation. Do the many pale, precocious, overtaxed, but undisciplined children of to-day promise well for this? Is it enough that our hearts grow warm with enthusiastic love for Pinel, and Dorothea Dix, and

others who have humanized us to a point of tenderness in caring for the unfortunate insane? Theirs was a noble work; but a still nobler awaits him who shall teach us to prevent insanity, and thus give to our country an insurance of safety in sound, steady, well-balanced and disciplined minds.

I do not despair of accomplishing much for the children of to-day, although it may be too late to do the best for them. We have brilliancy enough among them, and a sad amount of shrewdness and possibly incurable cleverness; but there is a menacing lack of power to cling to a purpose through all discouragements,— to grapple with unfavorable conditions and overcome them. There is little of the "staying power" which characterizes truly sane minds,— those sturdy, unflinching minds that accept no defeat, that never whine over lack of opportunity, but force opportunities to attend them. In quietness and in confidence is their strength, and only such minds shall bring us to our desired haven.

Lack of perseverance and shiftiness of will result from bad heredity, bad nutrition, or failure in discipline. The last two conditions it is my purpose to discuss in a later work. In the present volume I shall present the important subjects of Heredity and other prenatal influences.

If the children of to-day are not all that could be desired, and if, indeed, we have caught many of them several generations too late to make the most of them, so much the more should we hasten — with careful steps — to right the wrongs of those yet unborn.

How can this be done except by giving to our utmost to all the people a knowledge of what tends to shape the destinies of unborn babes? It is true that knowledge, of itself, is often powerless to stay the tide of man's passions; and we often almost feel that it is useless to teach people, because desire, rather than knowledge, will shape their conduct. Yet it is knowledge alone that places the stepping-stones by which the few truly conscientious and earnest people pass on to better conditions; and these

in time lead others to follow. And so, to all who are eagerly hoping for a brighter future for our race, like a star in a stormy night, will appear the growing demand of the people for a more comprehensive knowledge of life. Everywhere thoughtful women are asking to be taught something about the development of mankind, and of the duties, responsibilities, and relations which this new knowledge reveals. Everywhere we find plain people asking for plain truths plainly told, and for a glimpse of the paths by which pioneer minds have groped their way to those truths. People not only want facts about life, but also to know how to explain those facts. This reasonable demand has too often been met by superficial instruction, as if to satisfy children clamoring for toys.

Scholars are, for the most part, too busy and too absorbed to give in plain words to the unscientific world the wished for knowledge. Indeed, among scientists it is considered somewhat discreditable for one of themselves to present his views to the public before those views have

been pretty generally accepted in scientific circles. A scientist must make no bid for popularity. He must keep an eye single to the honor of the science he serves. But, since all knowledge is in a transition stage, and facts are so intermingled with theory that the two can be put asunder only by doing frequent violence to both, and since this condition promises to outlive our own and many future generations, if the people are to wait until all controversies are settled before sharing in what has been achieved, then, indeed, does their case seem hopeless.

They wish to know, and have a right to know; and, if they are not taught by those who speak with authority, they will continue to flock to the advertising charlatans who have no scruples as to the amount of chaff that goes with the few grains of truth dispensed.

Of all seekers after knowledge, perhaps mothers, by very reason of their motherhood, have the largest right to share in the wisdom of the wise,—to have freely opened to them the store-houses of the garnered knowledge of the

ages,— even to have knowledge brought to them and poured out in as full measure as they can receive.

It is therefore to mothers, and to those who hope to be mothers, and to all patriotic women who feel a motherly interest in the race, that I present here a few facts about heredity,— a subject that cannot fail to appeal to all true motherhood. While laying aside scientific language, I shall try to hold fast to scientific truth. If by these pages any are led to inquire further, to observe more carefully, to think more deeply, to act more guardedly, then my purpose will have been achieved.

It is true that in the present state of our knowledge a study of heredity demands a consideration of much that has not proved its right to be called more than theory. But theory is an invaluable handmaiden to science; and, so long as it is kept thus subordinate, it aids much in discovering important truths, and in fixing them in mind ready for use on occasion. To follow great men, even in their disagreements, as they

seek to explain the causes of recognized effects is inspiring, and lends beauty and importance to the facts we seek to understand. I have, therefore, not shunned theory in the following pages, but have sought to distinguish it from fact in so far as the two are separable.

To those who feel unwilling to study heredity because of the dread of added responsibility which greater knowledge entails, it is enough to say that "without courage conscience is a sorry guest"; and invited ignorance never lessens, but always augments, responsibility.

I have met some good people who cheerfully threw off upon God all responsibility for their unborn little ones, clinging to the consoling belief that a just Creator would not handicap any of his children by starting them in life burdened with the frailties and sins of their ancestors. Yet these same people are much concerned about their children *after* birth, giving careful heed to their surroundings, teaching, and guidance. Is there no inconsistency in believing that a just God can allow these latter conditions to affect

the character, but that he would cease to be just if he allowed before-birth conditions to do the same? Surely, the child is no more responsible for the conditions in which he is placed after birth than for his pre-natal condition. Therefore, not until we feel exempt from duty in a child's education and training can we logically rid ourselves of a recognition of duty toward him in his pre-natal state.

In contrast to those who lightly cast off their responsibilities for the unborn, are a few so acutely sensitive to their duty in this direction that they suffer a constant terror lest an unwary touch, or unguarded step of theirs bend some human twig to become a crooked tree. "Ah," sighed an anxious mother, "if my babies were only monkeys, and it mattered little whether I spoiled them or not, how I should enjoy them! But, when it is so easy to make them go wrong, I live in constant fear of them." Such mothers may take comfort in the fact that Nature is sturdy and untiring in her efforts to undo the mistakes of man. Clear her path ever so little,

and she tends to return to the normal. She is never a merciless engine, dragging fatefully to degeneration; but a tender mother, unwearying in her efforts to bring the race to perfection; though often forced to sacrifice individuals to her great purpose. So, as Lowell effectively puts it, "If God lets us play with the match-box of the universe, he takes care that the social framework be fire-proof. Therefore, we may take great comfort in God."

The study of heredity cannot fail to make us more tolerant, more sympathetic, more ready to forgive. While it awakens us to our own responsibility, it shows us that we cannot measure the responsibility or accountability of others. It proves the wisdom of that greatest of all commands: "Judge not, that ye be not judged."

Humbly, reverently, let us approach the subject of heredity, aspiring to the best knowledge, yet not too austere in wisdom. Let us "look deep into the tangled mysteries of things; refuse credence to the absurd, and allegiance to arrogant authority; sufficiently conscious of

fallibility to be tolerant of all opinions; with a faith too wide for doctrine, and a benevolence untrammelled by creed; too wise to be wholly poets, and yet too surely poets to be implacably wise."

Chapter II.

HEREDITY.

A NEW-BORN babe was laid in the eager arms of its mother. Her hungry eyes searched the tranquilly inexpressive little face for an elusive likeness. Disappointment hovered near; but she refused it recognition, and smiled.

"It is like classical music," she said, her eyes still intent on the babe.

"How?" I asked.

"Its beauties must grow upon one."

"And then," she added, dropping an arch look of apology upon the child, "some one has said that classical music is better than it sounds; and I am sure that baby is better than he looks or sounds, either."

"Yes," I said, "you will soon read in his face a mighty declaration of independence, and hear in his cry an emancipation proclamation."

"At present," she answered softly, "I prefer the doxology; and what I would read in this little, queer, jumbled up countenance is an ancestral record." And, with pretty pride, and a resolute feminine blindness for defects, she brooded over the baby features, seeking a paternal likeness.

She seemed to find what she sought, hugged the idea passionately, and was content.

In her expectant search for a parental likeness in her babe, every woman declares her creed: I believe in heredity, the mighty and inscrutable power of like to produce like; the inviolable treasury of past achievements, and the keeper of the golden key to expanding possibilities. I believe in man, the triumphant product of ages, who, in obedience to heredity, sums up the characteristics of his race, displays the distinguishing marks of his tribe, is stamped with many traits of the family, bears the impress, in some degree, of the peculiarities of his parents, and yet has risen to a higher individuality, a more perfect selfhood, than any other creature.

It seems superfluous to summon facts to support a creed which every one accepts. More important appears a study of the process by which Nature achieves such amazing results. With thrilling interest we follow her as, through fixed, undeviating courses, she steadily pursues her purposes. Tirelessly, step by step, she repeats herself in definite, uniform processes. Each man is the product of such a process.

There are those who deny to heredity the same power over the human as over other species. These claim that mind and soul, and all that goes to make up character, are exempt from the law of heredity. But until psychology shall have settled for us more definitely the relations of brain and mind, we must treat them as interdependent and inseparable. Since everywhere we find them developing or failing in unison, we must assume that what affects one affects the other: and since the brain, as a part of the body, must be subject to the laws that govern the body, so mind must in its manifestations be subject to the brain. If heredity can determine the shape

of a nose, the color of an eye, the structure of a lung, it can also influence the form and mobility of brain structure, and through this affect the mind and character. That mind and body react wonderfully upon each other no psychologist doubts; and that the mind (whatever the thing may be that we thus designate) may exert a powerful influence upon the brain, and through the latter upon the whole body, is unquestioned.

The feeling that it partakes of irreverence even to cast a longing glance over the hedge into the field of scientific inquiry concerning the sacred nature of man, has blinded us to much that might have helped us toward divinity. I have never found a divinely ordered "keep off the grass" sign in any field of investigation into Nature's methods of working. On every side there are many unpenetrated fields, and no field is fully explored. All are inviting; and, wherever we go we find abundant food for reverence. If Science does not loudly proclaim a God, she certainly has never denied him. She humbly seeks to acquaint herself with law, and

does not presume to reveal to us the law-giver. One might as well refuse to learn the double rule of three, because it does not prove the existence of God, as to refuse to listen to Science for such a reason.

Until we began to inquire of her humblest creatures, Nature remained mute as to how she accomplished her greatest work. From the lowliest of all we have learned the alphabet of the science of life.

With the aid of a microscope we may find in a drop of stagnant water the teacher whose primary lessons are indispensable to any adequate understanding of the architecture of the marvellous human temple. This teacher is but a minute speck of living jelly, called *protoplasm*. In one spot the structure of this jelly differs somewhat from the surrounding protoplasm. We call that spot the *nucleus*. The protoplasm with its nucleus forms a *cell*. Within the nucleus of the cell resides a life-giving power. Whence this power originally came the humblest intellect knows quite as well as the most learned. We say that

this tiny, one-celled animal has life. Yet we know not what life *is*. We only know how it *acts*. We shall return to this little creature later for other lessons of life's manifestations. Here we are concerned to know what it can teach us of reproduction and of the plan of architecture of animal bodies.

When this tiny animal has grown to full size, its nucleus splits into two parts. The surrounding protoplasm then also divides, half of it going to each half of the split nucleus. Thus are formed two separate and distinct individual cells, essentially alike, and each resembling minutely the parent cell. It is evident, then, that the parent cell is not dead, but has only had its life multiplied in the daughter cells. Neither of the daughter cells *is* the parent, yet both *were* the parent. We cannot say that their life began when they began individual life. It is evident that their existence reaches back as far as that of the parent, of which each is a part. The two cells grow until they reach maturity; whereupon each divides, after the manner which gave it its own birth, and

four new cells are formed, all equally partaking of the life of the first. Still there has been no death, only further multiplication of life. This process may go on indefinitely, and each resulting living cell is as much a part of the first one as if that first one had been at once broken into a million pieces, and each piece had grown into a new animal.

Since the life of the first is in the life of each successor, then, in so far as there is no known limit to the number of progeny, that life is, so far as our knowledge goes, potentially immortal; and, since each new individual is really but an old one split in two, an ancestral likeness is inevitable. The first lesson, then, from our humble teacher is one of continuity of life and inheritance of original traits.

It is evident that if from any cause a one-celled animal becomes different from others, when it splits into two its halves will also differ from halves produced by the splitting of the others. For instance, if one cell become larger and stronger by reason of better feeding; or if, by starving, the

growth be stunted; or if by accident it be deformed; the cells resulting from its division must be correspondingly larger and stronger, or smaller and weaker, or deformed, as the case may be. Thus any acquired change will be handed down to posterity. And this is our second lesson,—the inheritance of acquired traits.

Before we can apply these lessons in the case of animals built of more than one cell, we must have a lesson on the architecture of such bodies.

Let us suppose that, when a one-celled animal divides, the resulting pair, instead of separating for an independent existence, remain side by side, and fasten themselves together by a substance which they manufacture. But they grow and divide just as independent cells do, and become four cells, which also remain fastened together. Division continues until a large community of united cells is formed.

If this community were arranged in a solid block of cells, only those on the outside could reach food, or be warned of approaching danger, or cast off waste matter; and these, therefore,

would be obliged to do most of the work of the community, while those on the inside must either die for lack of nourishment, or become paupers upon their more fortunately placed neighbors. To obviate such overtaxing of a part and pauperizing of the rest, the cells are arranged in the form of a tube, into which can flow food-bearing fluids, and out of which can be cast waste matter. By means of this arrangement the outside cells are free to devote themselves to protecting the community and to acquainting it with outside conditions, while cells within the tube take up, dissolve, and digest the food that flows through it, and pass the nourishment on through tiny channels to parts of the community otherwise employed. Different cells having different work to do, each will assume a shape and size best adapted to its particular labor. Those which do a special kind of work will generally be located together, and form what we call an *organ*. For example, the heart, lungs, kidneys, liver, etc., are but a union of cells similar in kind and doing similar work. (To be

accurate, it must be stated that the organs and tissues of the body consist of the *products* of cells, as well as of the cells themselves, and that often these products exceed the little workmen in bulk.) The changes in cells to fit them for different kinds of work we call *differentiation.*

Now our own bodies are built on the simple plan of a community of differentiated cells (together with various substances manufactured by them), arranged in the form of a tube, with millions of tiny channels for carrying food from the central canal to every part of the body. But, as we have a great many things to do, so we have a great many different forms of cells and combinations of cells,— many more than have the very simply constructed animals, with their few tasks. The health of our bodies is merely the proper condition and working-power of each of this vast community of individual cells: each one a living thing, yet each dependent for life on all the others.

Every human being begins his career as a tiny one-celled animal,— a mere egg-cell, a minute

speck of protoplasm with a nucleus,— hardly to be distinguished from our little microscopic friend of the stagnant pool. By dividing and subdividing, this speck of protoplasm builds up the human body. But, before it begins to divide and develop, it must always unite with another cell (also but a bit of protoplasm with a nucleus) coming from the opposite sex. The two cells coalesce, the two nuclei become one, and the fertilized egg-cell thus formed is ready to begin its creative work of building the body of a new being. In it are wrapped up all the determining factors, all the hereditary elements, of the new creature.

The differentiation of cells and their union and groupings into organs are never haphazard, but invariably follow a precise method. Herein lies another great miracle of life, another gulf between the merely physical and the vital forces, which gulf Science has not bridged; for, although all cells of all species follow the same line of development up to a certain point, there is something that fixes with unerring precision the exact

point where each species shall diverge from the common path.

The human egg-cell, in developing, always passes through stages of existence akin to those of lower forms of life,— the fish stage, the reptile stage, the monkey stage,— yet by no possibility can the human egg ever produce a real fish, a reptile, or a monkey, although in the full-grown man are found many relics of these stages of his existence. Beneath the skin of the neck of the foetus one easily distinguishes the gill slit, corresponding to the gills of the fish.

The unvarying tendency of any creature to follow in development the footsteps of its progenitor, until, passing on from stage to stage, it reaches the final development of the species from which it sprang, is what we call the law of heredity.

How comes it that two cells, starting out apparently exactly alike, and following at first the same pattern, should end so differently? We can only say that there must be in the one cell something that the other lacks. There must be folded

within the nucleus of the man-cell all the essentials for the development of a monkey, and *something in addition.*

All creatures, then, metaphorically, start out on the same road in the journey of development. Some stop after going a very little way, and locate on variously branching cross-roads. Many go on with the crowd another day's journey, and then branch off. Others go still further before turning to follow diverging paths. And so the multitude ever diminishes until at the end of their common route man and monkey are left the only companions; and then they, too, part company.*

In this journey of development the ultimate destination of every cell is absolutely predetermined by its own character. Should it halt at any of the cross-roads where a lower species has remained fixed, it at once perishes. It can never diverge from the common road by any other

* A very common popular error is the belief that Darwin taught that man is a descendant of the monkey. Darwin merely showed that somewhere in the remote past man and monkey had a common ancestor, and that this ancestor was less remote than any that unites us by ties of blood with other species.

pathway than that its ancestors chose. With them it follows the allotted cross-road, with its closer kin turns the home lane, little groups seek different houses, and finally each individual finds his own private room.

The reason, then, that man must always beget man, and by no possible chance can produce a fish, a reptile, or a monkey, is that the human fertilized egg-cell contains an element, or a group of elements, which determines just what organs, and what manner of organs, shall come from that cell.

We are now forced to leave the field of certainty, and seek further knowledge, with analogy for our guide, in the realm of the probable. We may conceive of a group of elements consisting of the minutest molecules (the molecule being the union of two or more atoms), each capable of producing a definite number and a definite kind of cells. Each molecule, then, would "determine" what kind of an organ should be grown; and the group of such molecules would determine the body to be developed. These suppositive

molecular elements have been variously named. Let us call them simply *hereditary elements.*

The fertilized egg-cell, being the union of a paternal and a maternal cell, will contain hereditary elements from each. If we ask whence came these elements, we are again led into the field of analogy and conjecture.

When an animal is composed of many differentiated cells and organs, it is evident that it cannot reproduce itself by merely splitting in two, as the one-celled animal does. Some of the cells in the many-celled animal must therefore be set apart for the purpose of reproduction, and at the same time the cells which enter into the structure of the body must lose their power of transmitting life, and, consequently, that of indefinite multiplication. The reason for this is that it is better for the species that individual bodies should die, after having passed their life on to new bodies. Otherwise we should, through accidents, have numberless mutilated beings living indefinitely, since no one could for centuries escape mutilating accidents; and, besides, if there

were no limit to the multiplication of body cells, bodies would keep on growing forever, and beyond their power to nourish themselves.

Weismann, the great German scientist, teaches that, when a fertilized egg-cell divides, thus starting the growth of a new being, two kinds of cells are formed. Of these, one kind is the "*body-cell*," which, by dividing and subdividing into a community of cells, and manufacturing various substances to lie between, to connect the cells, forms all the organs and tissues of the body. The other kind is the "*germ-cell*," which has nothing to do with the body, except to be lodged and fed by it; but, like the amœba, is capable of indefinite multiplication, and is potentially undying. This is the first and most important step in differentiation and division of labor. Any one of the germ-cells may, after union with a germ-cell of the opposite sex, produce the body and germ-cells of a new being. Until two cells of opposite sex have united, neither can give rise to body-cells, though each can produce numberless germ-cells, powerless, like themselves, to develop a body, until union with the opposite kind takes place.

The germ-cell is the receptacle for what Weismann calls the "germ-plasm"; that is, the hereditary element, or substance, which he believes has been passing from one generation to the next without interruption since the first living cell became two.

We might say that the fertilized germ, or egg-cell, of a many-celled animal has within it a mortal and an immortal part. Early in development these separate, and from the mortal part (the body-cell) a house is builded for the immortal (the germ-cell) to inhabit. The immortal germ-cell produces other little immortals like itself, which remain quietly at home in the body until sought by a germ-cell from the opposite sex. Then union takes place; and the united pair at once begin to build a home of their own, after the pattern of the ancestral mansion, using for it their mortal part, and also to produce from their immortal part other little immortals to live in the new home, until these also, in turn, are sought in marriage, and go forth to dwell under their own roof.

When we speak of the germ-cell as immortal, we, of course, do not mean that it cannot die, but only that, if it meet with the proper conditions, it may go on reproducing itself without limit, and live in its descendants. As a matter of fact, millions of germ-cells perish for every one that matures. Most of them are cast out homeless, and perish from want. For each little immortal must, in order to live, be housed within the mortal body, and fed by the agency of mortal cells.

Weismann believes that the germ-cell, containing the hereditary elements that have come down from all past generations, is so independent of the body that the former cannot be influenced by the latter (except as will be hereafter explained), and that, therefore, any change in the character of the *body* will not produce a corresponding modification of the *germ-cell* to determine the inheritance of the body's change. An accidental alteration in the ancestral mansion will not influence the plans of the little cells that inhabit it when they begin to build a home for themselves. They will build

only in accordance with approved ancestral types. They will make their house like the one their parents originally builded, ignoring all accidental changes. The size, shape, and amount of the building material are prescribed for them; and they must use it according to its kind and amount, the variations allowed in building being so slight as to serve only to distinguish one structure from another, and to give a desirable individuality.

How, then, does it come to pass that no two bodies are exactly alike?

When the male and female germ-cells unite, they mingle their hereditary elements. Certain elements determine certain organs. If the element that determines any given organ be weak in both the paternal and maternal germ-cell, the organ resulting from the union of those weak elements must be weak. If, however, the element determining an organ (say the lungs) be weak in one of the ancestral cells and strong in the other, there may result lungs of medium strength, unlike either the father's or the mother's.

Thus the hereditary elements may strengthen one another, may neutralize one another, or each may add its weakness to the resulting whole. The elements are extremely complex, and no two cells could possess an exactly similar arrangement of them. Much less would it be possible, in the union of two sets of such extremely complex particles, to secure each time the same combinations as to potency.

The elements of the maternal cell may predominate in forming one organ, those of the paternal cell may be chief agent in producing some other organ, or the two may fuse their elements to form an organ unlike that of either of the parents. But never can a strong organ result from a combination of two weak determining elements. This fact has a most important bearing upon the so-called inheritance of disease, which, in most cases, means not the actual transmission of disease, but the inheritance of a weakened condition of an organ or organs which are thereby rendered peculiarly susceptible to the invasion of disease. For example, all forms of

nervous disease (except, of course, such as are due to local injuries) should be regarded as representing a weak condition of the nervous system as a whole. The different forms of disease in which a weak nervous system manifests itself will depend largely on circumstances. The manifestation may be as epilepsy, hysteria, insanity, drunkenness, or merely as "nervousness," or irritability of temper, according to which part of the weak nervous system happens to be most under strain; but, whatever the form of disease, the underlying abnormal nervous weakness is the same in kind, though perhaps not in degree. It is plain that, if two people suffering from different forms of nervous disease marry, the offspring are liable to suffer from a third, more severe form, because it is the *underlying weakness* of the nervous system of both parents, and not the *form* of their disease, that is inherited. We shall consider this fact more fully further on.

It is the union of maternal and paternal hereditary elements, in ever-varying combinations, that renders it impossible for any two bodies to be

exactly alike, or for any person to be exactly like either parent. When the elements combine in the fertilized egg-cell, there is probably a "struggle for existence" and a "survival of the fittest" amongst them; and, in order to produce a fairly normal individual, the weak and poor elements in one cell should be compensated by those of extra quality in the other.

When the fertilized egg-cell (after mingling its hereditary elements) divides into two cells, if one of these goes to form the body, while the other produces germ-cells which are to lie asleep within the body until awakened to activity by the touch of another, then in these sleeping germs must reside hereditary elements similar to those which have formed the body,—similar, yet not exact duplicates. It is easy to imagine that some *defective elements* might remain quiescent in the germ-cells and be passed on from germ-cell to germ-cell without appearing in the body for even a number of generations; but at last, meeting with the element necessary to call them into activity, they would develop into imperfect

organs in the new body. As a matter of fact, any given defect is quite as likely to lie dormant through one generation, and show itself in the following, as to develop in the first. This seems especially true of the weak and unstable nervous system that manifests itself in morbid desire for excitement, and craving for stimulants — a condition underlying most drunkenness. It is very common for the sober, virtuous son or daughter of a drunken parent to produce children prone to debauchery. Other nervous diseases also tend to skip a generation; and it is by no means rare for an ancestral defect to reappear several generations after it has seemed to be eliminated.

While Weismann denies that the condition of the body-cells can *directly* affect the germ, yet he admits that *indirectly* the health of the body may materially influence its immortal tenant. It must be remembered that, although the germ sleeps the greater part of its life within its home, yet it must necessarily be nourished and tended by the same servants which carry food to the body-cells.

Each germ-cell, before it can mate, must also grow and ripen; and, to accomplish this, it needs pure and plentiful food. If starved or poisoned by bad blood, or if deprived of oxygen, it must grow feeble, even if originally strong. That the germ-cell of either sex may be deeply injured by the dissipations of the person who is its host is beyond question. That such injury is more certain and intense as the germ nears its ripening, and culminates in force at the moment of procreation, seems to be the testimony of experience, since children begotten during drunkenness or a diseased condition of one or both parents strongly tend to the abnormal. In children under my care I have observed mental defects which seemed accounted for only by conception having taken place immediately after one or both parents had been violently angry, or seriously depressed by bad news, or had suffered shock from fright.

Too little attention has been given to the study of the influence of diseased blood conditions upon the immature or unripe germs. If there is an immortal element in the germ-plasm,

handed down through all generations, then the conditions which surround it and maintain its life are important at all times; and the young man who has weakened his constitution by excesses which deteriorate the blood, as all excesses do, may have irremediably injured his children, even though he has reformed and regained health before they are conceived. While aware of great liability to error in assigning a cause for any given defect in a child, I have found that, where a complete record of prenatal conditions is obtainable, defects that cannot otherwise be explained give a history of a temporarily exhausted or over-excited nervous condition of one or both parents before the child's conception.

Katie G., a young woman who was for years a patient of mine, suffered from most excruciating and intractable headaches. Her heredity seemed excellent, both parents being in good health. The mother had also been perfectly well prior to the child's birth. There was no nervous disease in the family, and the habits of both parents were exemplary. I was totally at a loss to give

the much pressed for explanation of the origin of the child's trouble, as there appeared to be no local disease to which it could be attributed. Incidentally, one day I learned, however, that her father had, more than a year before her birth, undertaken a mental task that taxed his powers to the uttermost. He had worked much when he should have been sleeping, and had become temporarily moody and irritable and inclined to headache. This I felt, and still feel, was the long-sought and hitherto elusive explanation of the child's sufferings. Similar instances might be multiplied from my case records, but the one is sufficient for illustrating my point.

To sum up Weismann's teachings as to the relationship of the two kinds of cells, we may say that he denies that changes taking place in body-cells *after birth* can produce corresponding changes in offspring. For example, the arm of a blacksmith made strong by exercise, or the brain of a scholar improved by study, transmits none of its acquired strength or improvement. It is the *natural* strength of muscle the *inborn* capacity

of brain, the *original* quality of organs, that stamps its character upon the child. Yet *germ*-cells may be injured by the same blood conditions that tend to weaken constitutionally vigorous muscles, or to deteriorate originally strong brains and nerves; and such injured germ-cells produce inferior muscles and brain even in children whose parents were innately strong and intelligent. In other words, it is not the condition of the bodily organs that affects the progeny, but it is upon the state of the blood which feeds both that both depend for strength. Therefore, where one is weak the other is likely also to be weak from the same cause. On the other hand, germ-cells constantly bathed in pure blood and richly supplied with nourishment become vigorous for production of healthy organs even in children whose parents are not originally strong. How far back these influences may reach in the life of the germ, none can know. The child, then, is perfected, not by perfecting through exercise any organ or organs of the future parent's body, but by the excellence of the blood which keeps both body-cell and

germ-cell in health. To admit a minimum of poisons from without, to form or retain a minimum of poisons within, to rid the body of its waste, to furnish pure air and good food,— these are the requisites for healthy germ-cells from which grow healthy bodies.

Many, perhaps most, scientists do not agree with Weismann, that acquired characteristics are not inherited; that is, that the body does not directly influence the germ. Darwin, since championed by Spencer, propounded an ingenious theory to account for the influence of body-cells upon descendants. He supposed every body-cell to give off from time to time certain minute particles, which he called "gemmules," and that these gemmules are capable of producing cells like those from which they emanate. The "gemmules" attract each other, and are consequently brought together, and unite to form the hereditary elements. Of course, weak and deformed cells would produce weak and deformed "gemmules," which, in turn, would produce similarly abnormal organs in the new being. Many

experiments have been undertaken to prove that injured body-cells, though originally normal, will bequeath the acquired abnormality. But the fact that Nature never leaps from one condition to another, but always brings about changes very gradually, renders such experiments difficult to complete: many generations must be observed before marked changes become manifest.

Nature creeps cautiously from stage to stage. She clings with fateful determination to a type, insistent only on repeating what she has done before, set on copying every commonplace detail, every ancient trick of form, every strong precision of method. Apprehensive of change, she is alert to stamp out all that differs in marked degree from the usual. A worshipper of the "golden mean," she sacrifices to it everything outside the charmed circle of habit. Yet she picks up at every step of her slow and cautious course a thousand modest variations which she treasures; while to any obtrusive variation from a type, however useful, she refuses tolerance. A genius may spring from unintelligent parents through

some extraordinary fusion of the hereditary elements, or through some chance influence upon the germ-cell. But, alas! the variation is too great; and, deaf to its plea of usefulness, Nature refuses to pass on the unusual ability to the children of the genius. They frequently descend to the level of the grandparents, or to a level but slightly higher. A permanent high grade of intelligence comes not to any race at a bound; but gradually there may accrue to each succeeding generation in any line a broad mental capacity that will persist and increase, until some unsuitable union destroys it.

In case of a large non-useful variation from a family type, as monsters, dwarfs, idiots, etc., Nature forbids the variety to propagate, or sees to it that the progeny quickly dies out. Idiots born of good families are usually sterile; yet by *gradually* reducing the intelligence of any line, by consecutive union of unintelligent progenitors, offspring approaching idiocy may result, and they may retain their procreative powers. The danger, then, from what we might call the *accidental*

idiot is less, so far as continuance of his kind is concerned, than from the one whose intelligence has been gradually destroyed through successive generations. So strongly does Nature object to great changes that she will rarely permit the mingling of the hereditary elements of two different species; and when she does occasionally allow it, under protest, as in the ancestry of the mule (the progeny of the male ass and the mare) she takes care that the offspring be practically sterile. If she permitted the mingling of species, there would be no end to violent variations. All this goes to show how she defends the type,— "So careful of the type she seems, so careless of the single life." Since this is so, it is easy to realize that a deformity or an injury inflicted upon an animal for experimental purposes might well be ignored by type-loving Nature as too large a variation. Chinese women have deformed their feet for ages, yet Chinese babies continue to be born with perfectly formed extremities, and we, of a more recent but more vaunted civilization than they, have compressed and deformed more vital parts,

and Nature also ignores in the offspring the artificial variation; and there is no reason why heredity should recognize such a violent and useless departure from the normal.

But that heredity does preserve *slight* variations, even when accidental, there is good reason to believe. This is especially true of certain nervous disorders, notably epilepsy. This disease, having been induced in previously healthy animals, by an injury to a part of the nervous system, was afterward transmitted to the offspring. Probably, in such cases, the disease is really the result of some slight change which the injury has wrought in the nerve-cells by interfering with their *nourishment;* and this slight *nutritional* change, and not the injury itself, is what heredity seizes upon to perpetuate. A very slight defect in the nervous system may produce monstrous results; while a similar defect in some other part of the body may escape notice, just as a grain of dust within the delicate machinery of a watch may disarrange the action of the latter more completely than a handful of sand would disturb a coarser

and simpler machine. Then, since small variations from a type are the kind most frequently transmitted, and slight damages to the nervous mechanism are more productive of disease than are similar injuries elsewhere, we should expect to find inheritance of nervous troubles very common. And such is, indeed, the fact.

It seems of small practical importance whether we believe with Weismann, that body-cells have no direct influence upon the germ-cells; or, with Darwin and Spencer, that body changes, when not too great, are reflected in the germ. So long as all are agreed that the conditions upon which body health depends are likewise the conditions necessary for healthy germ-cells, we arrive at practically the same point as regards methods for securing good inheritance, whichever theory we advocate. In any case we infer that strong and healthy bodies will be likely to be inhabited by similar hereditary elements, both because these elements come from a part of the same cell which formed the body, that is, from a strong and healthy cell, and because the pure blood, carry-

ing good food and little poison,—the same blood that has made and kept the body strong,—has a similar effect upon the germ. And yet it is possible for the body to recover from a disease which has inflicted lasting injury upon the germ, and also for the germ to retain ancestral defects which are not manifested in the body, but seem held over, as it were, for some future body. It becomes necessary, then, for us to inquire not alone as to the present health, would we learn the probabilities of a good posterity, but also as to ancestral tendencies for at least two generations, as well as to previous diseases of the candidate for parenthood.

The marriage of kinsmen would appear somewhat risky, since the same weaknesses are, in such cases, liable to exist in a latent state in the *germ-cells* of each parent, even though they be not prominent in the *body* of either; and in the case of relatives the chance of the weakness of one parent being compensated by strength in the other is diminished. Still, when the common ancestry of blood has been free from

defect, the issue of such marriages may be excellent. For the best mixture to result from hereditary elements, Nature seems to require that they be not too much alike, in order that some variation may result in the offspring, and yet that they be not too different, lest the variation be excessive.

It is not probable that the ordinary, transient illnesses of the body affect the germ permanently, unless they occur at some critical moment in the life of the latter. That the paternal cell is profoundly influenced by the state of the father's blood seems certain from the fact that, if he be ill at the time of the procreating act, the child is very liable to be weak and abnormal. I have had under my care idiotic children, born of intelligent parents, who had begotten the offspring while the father was suffering from malaria. Children of the same parents, conceived after the father's complete recovery, were normal, showing that the germs had also recovered.

The poison of syphilis, once in the parent's blood, seems to exert a permanently injurious

effect upon the germ-cell. No person who has once been afflicted with this disease can be assured of healthy offspring. We are informed that from eighty to ninety per cent. of the men in some of our large cities suffer from this or other diseases which are liable to entail untold suffering upon their wives and children.* In the smaller cities and rural districts the proportion is less, but still great. Surely, fathers should know to whom they give their daughters in marriage; and mothers should gain the confidence of their sons, and efficiently warn them of this monstrous danger. The women who prefer a man who has "sowed his wild oats" or who "has a spice of wickedness," little dream of the bitter harvest they themselves may reap from the remaining seeds of those wild oats.

A few States have already made illegal the marriage of any person afflicted with syphilis or gonorrhœa, but such laws are not likely to be enforced

* My authority for this statement is Dr. Wasthin, Professor of Pathology in Michigan University, who, in a lecture delivered to the students in 1890, gave this appalling information on the authority of eminent New York physicians.

until people are better educated as to the fearfulness of these scourges. When women are once fully aroused to their own danger, it is to be hoped that they will make such laws superfluous.

The importance of having the weak hereditary elements of one parent compensated by extra strength in the other has already been emphasized. Nature is such a slave to habit that, the oftener she transmits any peculiarity, the more stubbornly she persists in preserving it. Therefore, when a disease or a defect has but recently made its appearance in any line, and has manifested itself in but few members of that line, it is quite possible for it to be eradicated by carefully selected unions with those in whose ancestry is no similar defect. It must be remembered that by "similar defect" we do not mean, necessarily, the same disease. Any organ may be composed of weak or defective cells, growing from weak or defective hereditary elements, yet be strong enough to do its ordinary work, and keep in health, so long as no extra task is required of it; but, once

overtaxed or surrounded by conditions less favorable than ordinary, it shows small resistance, and little power of recovery, and easily yields to the invasion of disease. Such is frequently the condition of the nervous system, which, though comprised of the brain, spinal cord, and nerves, is really a united whole, so that weakness in one part usually means weakness of all. And, as explained previously in this chapter, just what part of this weak whole may succumb to disease will depend on individual circumstances. I repeat that weakness of the whole is inherited rather than weakness of any particular part, and for this reason a different part from that diseased in the parent may become the seat of disease in the child. If the father be afflicted with one form of nervous disease, and the mother with quite a different form, the child inherits a double tendency to *some* form, perhaps quite unlike that of either parent, but in all probability more severe than either. I have seen insane offspring result from the union of a woman who was greatly inclined to worry, and yield to spells of the "blues," with

a man who was merely eccentric; also, when one parent was subject to severe neuralgia, and the other to violent temper. Insanity in the parent often gives rise to epilepsy in the offspring, and epilepsy to insanity. Either may result in idiocy. Melancholia seems very frequently inherited in the same form, and suicide often runs for generations in a family line.

In a study of two hundred and forty cases of epilepsy under my care I found that drunkenness had existed in the ancestry of one-third. In some of these cases the father drank only occasionally, but was under the influence of intoxicants when the child was conceived. I cannot but feel it important to once more call attention to the fact that children begotten during states of mental depression of either parent, or shortly after either has suffered from intense emotional excitement of a depressing character, as in anger, fear, dread, etc., are especially prone to mental and physical disturbances, because such emotions produce poisonous elements in the blood. I have seen many cases of erratic

and unbalanced minds, and imbecility, which seemed accounted for only in this way.

Apparent exceptions to the law of heredity, cases in which the child seems mentally, morally, or physically unlike either parent, are frequently observed, and appear at first glance to dispute the universality of the law; but could we in such cases know all the conditions which have influenced the germ-cell, and could we understand what hereditary elements may be expected to neutralize each other, or to combine in such a manner as to change both, we should probably be able to account for all apparent exceptions under the law.

Individual character is a resultant of many opposing and conflicting forces and tendencies. The force which impels to action, and the power which controlls and directs the impulse, should be nicely adjusted and well balanced.

Not infrequently one parent has strong impulses and desires, strong passions and many temptations, but has also a will of iron which has given him complete mastery of himself. He is a tower of strength and an honor to his race. But

he has married a woman who is sweet and yielding, good because she has no ruling passions within, nor pressing temptations without. She is the model wife and mother because she is so even-tempered and serene, so dutiful, so subservient to the will of another. The son of this irreproachable couple may — unfortunately, very likely *will* — combine the strong impulses and desires of the father with the weak will and yielding disposition of the mother. The unhappy result must be a character prone to excess, to immorality, and even to crime. "See," cry the unbelievers in heredity,— "see the falseness of your theory." And yet here we have a most striking example of unerring inheritance.

Heredity does not guarantee a complete likeness. On the other hand, each individual inheriting from all his ancestors (and counting them all from thirty generations back they amount to some billions) must be a most composite chip off many old blocks, and *must* differ from all. Just what combination shall result when the hereditary elements from two streams mingle to form a third

is something that can never be determined beforehand.

Very often the mistake is made of attributing to heredity conditions which arise from quite different causes. Many mothers are under the impression that all the peculiarities that characterize a child at birth are the result of heredity. This is very far from the fact.

In the following chapter we shall discuss the prenatal influences, other than heredity, that tend to form the mind and body of the infant.

Briefly reviewing the subject-matter of this chapter, we find that the following facts have been established by the students of heredity.

First. All human beings, like other highly organized animals, begin individual life by the union of two cells (one from each sex), forming a fertilized egg-cell. The cell thus formed contains all the hereditary elements that can enter as developing factors in the new being, or determine the kind of being that shall result.

Second. By dividing and subdividing, the fertilized egg-cell becomes many cells; and all these

arrange themselves (barring accidents) in accordance with the definite plan predetermined by the hereditary elements in the fertilized cell. Thus they build up a new body, which must always resemble the parents from whom its hereditary elements are derived.

Third. The strength of the new body and its power to resist disease will depend largely upon the condition of the parents previous to, and especially at the time of, conception. Strong bodies will produce similar hereditary elements; while bodies weakened by disease, excesses, impurities or poisons circulating in the blood, will give to the cells that produce the new being an inheritance of weakness which will render them unfit to cope with disadvantageous conditions, and will make them an easy prey to disease.

Fourth. The nervous system, and especially the brain, is slow to reach maturitv; and in its present development is man's latest triumphal achievement. Being, therefore, a comparatively recent acquirement of the human family, and very intricate and unstable, it is more liable to

damage and retrogression than are other parts of the body. We find, therefore, that, while nervous diseases and insanity cannot strictly be called inherited, except as they may depend upon a direct transmission of some faulty construction of brain and nerves, any weakness of the nervous system in either parent is very likely to result in weakness of the nervous system in the child; and unfavorable conditions, unbaffled, easily produce disease in such weakened brain and nerves. We frequently see in the offspring an entirely different kind of nervous disease from that of the parent. This is because, while the special form of disease is not inherited, the nervous weakness is; and circumstances and surroundings determine which part of the nervous system shall first give way.

Fifth. Weakness of any given organ in one parent should be counterbalanced by especial strength in that particular in the other parent. In such case the offspring stands a much better chance of escaping the unfavorable inheritance. Two people even slightly affected by nervous disease, though the disease may take a different

form in each, run serious risk in marrying, since the weakness in one nervous system meets no corrective strength in the other.

Such are the generally accepted facts as regards heredity. The acceptance of either of the theories as to the manner of transmission, whether by means of a germ-plasm which has passed down through generation after generation from the first ancestor, as Weismann believes, or through a germ-cell formed by the union of inconceivably minute gemmules given off from the body cells as maintained by Darwin and Spencer, is immaterial as affecting the final decision that healthy bodies (barring accidents) will produce healthy germs.

Chapter III.

PRENATAL INFLUENCES OTHER THAN HEREDITY.

FROM a hen's egg kept for three weeks sufficiently warm and moist will develop a chick, capable of growing into a fowl possessing the characteristics of the hen that laid the egg and of the cock that fertilized it. But if the egg be subjected to a severe shaking process, as in a railway journey, or if the tiny germ-cell contained in the egg be punctured, or a little poison be introduced beneath the shell, the hereditary elements may be so disarranged, injured, or weakened that they will produce a deformed chicken,—a monster. Obviously, changes thus induced have nothing to do with heredity. Only those tendencies which are inherent in the egg-cell before it begins to divide to form the body of the chick can be said to be inherited.

The case is similar with the human egg. All the hereditary elements are either present in the two germ cells (maternal and paternal) at the time of their union or are produced by their fusion. External influences brought to bear upon the growing germ or fœtus (as we call the germ during its developing period in the uterus) may modify the tendencies and growth of the hereditary elements, and bring about changes which result in characteristics quite distinct from the fruits of inheritance. Strictly speaking, heredity consists in an unlimited series of prenatal (before birth) influences, reaching back into the measureless past; and nearly every force that modifies heredity is, in turn, modified by the latter. Hence, of all prenatal influences, heredity must be looked upon as by far the greatest. Yet, for convenience, in this chapter I apply the term "prenatal influences" to any *external* agency affecting the germ previous to hatching, or birth, after the egg has been laid into its nest.

The hen stores up around the germ-cell of her egg enough food for the nourishment and growth

of the embryo, and then lays the egg into a nest *outside* her body. There, under appropriate conditions, it develops. The human egg, on the contrary, is laid into the uterus, a nest *within* the body; and food is brought to it, as its needs demand, by the mother's blood. In the case of an egg laid into an outside nest, the food supply is fixed in quantity and quality, while the human egg-cell may at any time during the growth of the fœtus have its food changed in kind or amount by changes in the mother's blood. For this reason the prenatal influences that may affect the germ as it develops within the uterus are more numerous and important than are the influences acting upon germs developing outside the body.

Living means a constant interchange of matter between the particles of the outside world and those of the living body. To *grow* necessitates a more *rapid interchange* of matter than merely to live. This is true not alone of the body as a whole, but of each of the little living cells by whose growth and division the body is formed.

Dead matter is in each cell constantly becoming living protoplasm, while living particles are broken up into lifeless matter and cast off. This change of dead matter into living matter constitutes an important part of nutrition, and upon its perfect and rapid, or slow and defective, action depend the health and energy, or the feebleness and low vitality of the body. There is no life without activity. Abundant life means great activity and rapid change. All bodily activity is more or less a process of oxidation or burning. Now to support combustion (whether it be the life fire which gives the activity of our bodies, or the coal fire which furnishes the heat in our stoves) we must have fuel and oxygen. In all cases the more oxygen, the brighter the flame; and, just as the fire becomes brisk in the stove when oxygen is sucked in freely by a good draught, so activity of body and brain are increased by a plentiful supply of this same important gas.

Nutrition is the process of supplying fuel for the life fires. The changes which constitute nutrition and growth must take place in each cell,

as if each were a separate individual. Therefore, every cell must come into contact with food, after the latter has undergone changes which fit it for use as building material, or fuel. Every cell must also be supplied with oxygen derived from the inspired air. Both food and oxygen are furnished to the fœtus by the ever-flowing current of the mother's blood. *Not all the food which the mother eats, but only that which she digests, and receives into her blood, is available for nourishing the growing child.*

For the healthy development of the fœtus there are three conditions; namely, that the mother digest well, breathe well, and that her blood circulate well.

To secure good digestion, moderate eating with abundant exercise is most effective. Voracity and idleness in the mother starve many a child by loading the blood with poisonous products derived from the food. When ill-digested products pass into the blood, they act as clinkers do in the stove, and extinguish, rather than sustain, the life fires.

The feelings of languor and weakness so often accompanying the spring are more frequently the result of accumulated poisons in the system, due to over-eating and under-exerting during the "shut-in" months of winter, than of lack of food or of overwork. All the tonics and stimulants and concentrated foods given in such cases have been by an eminent physician likened to the poker stirring a coal fire from above, when what is needed is a shaking out of the ashes. All good housewives know that poking a coal fire is a good way to put it out.

There have been devised for pregnant women certain "systems" of dieting, with a view to lessening the pains and dangers of labor. Widely popular in this country has been the so-called "fruit diet." This is supposed to retard bone formation in the fœtus, and thus render the head yielding, and easy to be born. There can be little doubt that, if the mother have good digestion, she will furnish a fair supply of nourishment for her child from even a very restricted diet; but I have had under my care a number of mentally

defective children, whose heredity was excellent, and whose abnormal mental condition appeared to me to be due to nothing else than the defective nutrition of their nervous systems while being carried by mothers who were subjecting themselves to fruit dieting. The diet that is so deficient in bone-forming material as to retard perceptibly the growth of the skeleton of the child is quite likely also to lack brain and nerve-forming material. In fact there appears to be an intimate relation between bone and nervous tissues as regards nutritive requirements. Doubtless perfect nutrition and care after birth will, in most cases, counteract slightly defective prenatal nutrition; but it seems not wise to deprive the pregnant woman to any marked degree of the phosphates found more abundantly in other grains than in rice, the grain especially recommended in conjunction with the "fruit diet."

The digestibility and nourishing quality of food are largely relative, and matters for personal experience to decide. Some people thrive excellently on food not in the least suited to others.

A study of many cases leads me to conclude that the best diet for a pregnant woman is that to which she is accustomed, provided it digests well and nourishes her own body. The nature of the food we take is largely the result of habit. It should be borne in mind that digestive organs have adapted themselves to food habitually taken, and not that special food has been provided for organs ready prepared to digest it. In other words, stomachs have become fitted to convenient food, and the food has not been specially created to suit varying stomachs. The horse eats grass because grass has for so long been the food of his ancestors that the internal machinery of the horse has formed the habit of selecting the required nourishment from these large masses of food material not rich in nutriment, and all the machinery has, by uncounted ages of habit, become adapted to such use. Such machinery would be utterly powerless, were it required to work as does the digestive apparatus of the lion. On the other hand, the lion eats meat, and is powerless to digest grass for exactly

the same reason that the horse cannot digest meat; namely, that the lion's digestive organs are unsuited to a task that they have never been required to perform. Human beings, having had wider range of choice than other animals, have a more varied diet than any other; and the list of foods for man's use is continually increasing. The diet of the savage is more monotonous than that of civilized man. A lady, who has had large experience in catering for different classes of people, has assured me that it is extremely difficult to introduce new dishes, however wholesome, among the less intelligent classes; while the better classes of people take to changes of diet much more cheerfully. This seems explicable on the ground that ancestors of the latter class have, as a rule, been accustomed to more varied diet; and their descendants, consequently, have a greater variety of tastes.

Since, then, digestive organs usually, and normally, act best upon the food to which inherited habit and individual habit have accustomed them, sudden changes of diet are liable to be injurious

through the inability of the internal machinery to suddenly readjust itself to new demands. I have seen farmers, who were accustomed to fried pork and corned beef and cabbage, made dyspeptic by the dainty dishes served by a zealous trained nurse. Chinese lose health when deprived of their accustomed rice, even though more nutritious food be substituted; while foreigners in China quickly become ill when confined to Chinese food. Because oatmeal has long been the diet of the sturdy, sinewy Scot, it does not follow that this dish will agree with every American. That any one may, without injury, gradually accustom himself to a change in diet, that meat-eaters may gradually become vegetarians, or *vice versa*, experience testifies. But racial, family, and individual tastes should not be utterly disregarded; and changes in the diet of healthy people should not be too sudden and pronounced.

In diseased conditions, on the other hand, decided changes may be called for. This is especially true of the change from a poor diet to a more nutritious in case of wasting disease. A

Chinese woman, well advanced in consumption, came to an American doctor for treatment. She was put upon a diet of bread, beef, and milk, none of which she had ever tasted before; and her improvement was marvellous. On the other hand, some Chinese students in this country lost strength rapidly on bread, beef, and milk, and were obliged to take to their accustomed rice and pork to improve digestion. An intelligent Chinese man while travelling in America assured me that he could not eat the soft-boiled eggs, so frequently on our tables, without suffering from indigestion; but the hard-boiled eggs, to which he was accustomed, he digested with ease. For the reason, then, that pronounced changes in diet may not be kindly received by the body, it seems unwise to experiment too much with the food during pregnancy. "Let well enough alone," seems to apply excellently at this critical time.

A consumptive patient of mine was advised to live largely on milk and beefsteak. She improved very rapidly, and in a year became pregnant for the first time. She was advised not to

change her diet during pregnancy, but to exercise very freely. As she was nearly forty years old, and this was her first pregnancy, we naturally anticipated a seriously difficult labor. It proved, however, short and easy; and the child was one of rare beauty and intelligence. I would not from this case argue the advisability of a meat diet for all pregnant women. Where little exercise is taken, such diet may prove most pernicious, and is to be recommended only when the mother's system seems to demand it.

Before the pregnant woman lies a labor requiring strength and endurance of muscle and nerve not unlike that for which the athlete strives in training for a special event. She, too, should be in training for the event on which she hazards such stakes. The athlete, when in training, avoids stimulants, confections, and pastry; does not take foods (such as warm breads) that form dense masses in the stomach; nor does he indulge in fried foods, so irritating to the stomach and impenetrable to the digestive juices He eats plain, nutritious food, and eats it slowly and

in moderation. He seeks to increase muscular force, to diminish fat, and to keep his body pure from clogging matter. In bathing, rubbing, and exercising he is zealous and faithful. If physicians would put their patients who expect to become mothers under similar training, instead of impressing them with the idea that all hope depends for them on not over-exerting, the pain and perils of childbirth and the consequent injury to the children would be materially lessened.

Since the destination of the great bulk of our food is, sooner or later, oxidation or burning, and since, the more complete the process of oxidation the more perfect are the life processes which result therefrom, it follows that deficiency of oxygen must always impede or frustrate the act of nutrition. Little food and much air will nourish the body, while much food and little air will poison it. With a plentiful supply of oxygen all the nutritive parts of our food are made available for use in body-building, or for heat and energy production; while with deficient oxygen much that we eat is wasted, or, worse than

wasted, becomes offensive garbage in the great community of cells which constitute our bodies.

Quite as indispensable to the growth and development of the fœtus as to life after birth is a free oxygen supply. Illustrative of this is the fact that, if an egg that is being incubated be coated with wax or varnish, so that air cannot pass through the shell, the contained chick quickly dies. The fœtus, in the obscurity of the womb, cannot come into direct contact with the air. Nature has therefore made provision to supply the necessary oxygen through the tireless stream which bears upon its current all other requisites for sustaining life,— the stream of the mother's blood. Millions of tiny boats, each laden with precious freight received from the air in the mother's lungs, pass ever to and fro, carrying their life-giving supply of oxygen to every cell in the mother's body, and to every cell as it grows and multiplies to form the body of her child. Discharging their freight of oxygen at a million ports, these boats reload with a cargo of carbonic acid gas, which they carry to the lungs, and dis-

charge, to be breathed forth by the mother. These boats are the red corpuscles of the blood. When they are deficient in number or in carrying capacity, the results are the same as when the supply of air in the lungs is insufficient.

Nature, being a rigid economist, obeys with somewhat blind persistence the law of supply and demand; and failure to maintain an adequate supply of air in the lungs, from which the oxygen cargoes are drawn, will result in diminishing the number and the capacity of the oxygen boats. On the other hand, a plentiful supply of fresh air in the lungs will remarkably stimulate the body's boat-building industry. Therefore, the best way to increase the red corpuscles in the blood is to give the lungs more air to take care of. Sunshine also gives a forcible impulse to boat-building, and air and sunshine are the giant forces which fight for us the destroyers of health. No woman has fulfilled every duty to her unborn child unless she has learned to *breathe well*, with lungs unhampered by tight clothing.

Full, deep breathing will in itself do much

to secure vigorous circulation of the life fluid; but such breathing should be encouraged and assisted, and the blood made to flow more freely by regular and systematic exercise. Any enjoyable muscular effort that does not require sudden or severe strain is permissible. By sitting for hours in a cramped position, stitching tucks and ruffles into the wardrobe of the anticipated babe, mothers with every stitch wound their unborn little ones. When necessity demands of a pregnant woman work that requires much sitting, she should frequently rise, exercise her muscles, throw back her shoulders, and breathe deeply, making sure that the air she breathes is fresh and pure.

We have seen how poisons may result in the blood through imperfect digestion or defective oxidation of food, but we have still to consider another important source of blood impurity. Experiments upon animals have fully established the fact that fear renders them much less than normally resistive to the effects of all kinds of poisons, including the germs of disease. An

animal kept teased and frightened succumbs to a dose of poison which has little effect upon an animal left in quiet. Fear, therefore, so influences the blood, probably by a distinct action in checking the processes of nutrition, that this life fluid fails to offer its usual sturdy resistance to treacherous invaders; and the body-cells, especially the weakest, seem to participate in the general panic, and lose their capacity for normal work. If we study the nature of the depressing passions and emotions, we discover in most of them an intimate relationship to fear. Even anger, which superficially appears to be the opposite of fear, frequently takes its rise from the latter emotion. A soldier, relating his experience in battle, said that at the first shot from the enemy he was nearly paralyzed with fear, but in a few moments a furious rage took possession of him, and clothed him with desperate courage. In many cases, anger appears to be but transformed fear, an expression of fear by resistance instead of by running away. It is often the over-reaction from fear. Certainly, its after-

effects are identical with those of fear, intense prostration following an ebullition of rage, while all the vital processes are hindered and deranged, and the blood loaded with poisonous products.

We all know what dreary forebodings, what desolating fears, crowd our hearts when grief sits in reason's place; and, as for that state of chronic fear which we call "worry," it points the shortest path to the grave. Could we but look into the forming brain and see the seeds of nervous weakness and disease sown there by mother's fears, more than all else, perhaps, we should be afraid of fear; and we should preach with zeal the glorious gospel of courage. Not the courage of belligerency which is a sort of anger and akin to fear, but the courage of cautious trustfulness, the courage which conquers present fears by not weeping hopelessly over past evils and by ignoring horrible imaginings. Even if "there was never yet philosopher that could endure the toothache patiently," and if "every one can master a grief but he that has it," yet with sufficient incentive the weakest may learn to bear yesterday's toothache

patiently and to master to-morrow's grief. And, after all, it is the toothache of yesterday and the grief of to-morrow that trouble most of us who worry. I have said that with sufficient incentive we might learn the lesson of mastery; and what stronger incentive can arise for a woman than the knowledge that, in conquering herself, she is winning victories for her child?

That the mother's mental states do powerfully affect the nervous mechanism of the child is no mere fancy based on unsubstantiated theory. Even after birth the nursing child has been thrown into spasms by the unwholesome milk of an angry mother, or of a mother into whose blood grief or worry or fright has breathed its poisonous breath. If these poisons can impart such noxious principles to the mother's milk as to cause alarming symptoms in a child who takes that milk into its stomach, how much more profoundly must they influence the younger, feebler organism of the fœtus when the blood of the mother, loaded with impurities, pours through the little veins! In such cases the delicate nervous system of the

fœtus will naturally suffer more than any other part of its body, the mental development being retarded or disordered, and a nervous, mentally defective, or ill-balanced individual will be the logical result.

Many unhappy mothers of imbecile children have confessed to me that they were possessed during the gestation of the defective child with an intense rebelliousness at the coming of another babe,— a rebelliousness amounting practically to a chronic state of anger. Such a mental condition is sometimes the expression of a physical feebleness rather than of a wicked heart; and I have known mothers to scourge themselves with the thought that their sins of rebelliousness were being visited upon their children, when it was really ill-health, and not selfishness, that throttled the natural instinct of tender yearning for the unborn, and planted revolt in their hearts. Knowing, however, the importance to the child of the mother's mind being free from depressing feelings during pregnancy, women will ask themselves whether they are not responsible for illnesses that

cause unnatural feelings of rebellion at such times. Of course, children should not be conceived when either parent is in ill-health; but, in case the mother's health fail after conception, such an enormous reward for cheerfulness is offered (that of keeping unjeopardized the child's welfare) that any true woman who understands the peril will make a courageous fight against the "dreary dumps." Discussing with a number of intelligent mothers the importance of controlling the depressing emotions and passions during pregnancy, I was surprised to be met with the almost universal opinion, based on their own experience, that efforts at self-control were at such times not only useless, but positively harmful to the child. "I once was a believer in such theories," said a bright, college-bred mother; "but, after I found that my only really sweet-tempered children were born when I had been acting just as I felt and flinging things around lively, I decided that all this prenatal influence talk was a bug-a-boo to keep us poor women submissive and good."

The mistake these women make is in supposing

that the outward manifestation of the feelings is the important thing to control, when, on the contrary, it is the *feelings themselves* that do the injury, and all the more injury when harbored silently, the effort at *repression* being more taxing than even violent *expression*, which often acts as a sort of safety-valve. "But how shall we control our feelings or emotions? It is but the *expression* of them that is under our will." It may be answered that we have no power of *direct* control over states of mind which are often but expressions of physical illness, but of all things the greatest in importance for self-control is to learn to steer one's mind; in other words, to turn it at will from one subject to another. This is a matter of habit to be nursed into vigor by vigilance and exercise. We can control a given feeling or emotion only by substituting another, and the mind that cannot be turned from its course at will is rudderless and needs repairs. The child that cries for a razor is satisfied with a jingling bell. So the mind, properly disciplined, that cries for harmful passion must be given a pleasant

thought. And herein lies all the advantage of a broad life, full of varying resources, over a narrow and limited life, with few interests and poor in thought-material.

That rebelliousness on the part of the mother, or an unwillingness on the part of the father to add to his family cares, should ever lead intelligent people to the deplorable crime of attempting to destroy their unborn babes seems almost incredible. It is extremely difficult to gather reliable information touching such criminal practices. There is a tradition, widely accepted even among good people, that before the fifth month of pregnancy the fœtus is not living: therefore to empty the uterus of its contents before that time is not destroying life. This belief is, of course, absurd. The first tiny cell from which we are formed has life, else it could not grow and divide; and, as soon as conception takes place, there is distinctly *human* life, because then the cell has all the potentialities of the human being. The Hindus are said to have instituted child marriage to avert the destruction of human life resulting from the

escape of the unfertilized ovum at the first menstruation. While we cannot look upon the cell as a human life before it is fertilized, since in that condition it is incapable of becoming a human being, and nature certainly does not intend all seeds to mature, yet, if an uncivilized people can go to such lengths in respect for human life, we, as a Christian people, should certainly inculcate a morality too high to countenance the murder of a growing child.

I have made many efforts to gather facts concerning the prenatal conditions of morally defective children, especially when they appeared as freaks or sudden departures from the moral standard of the family to which they belong. There are certainly many striking facts to suggest the importance of further investigation along these difficult lines. The following is by no means an isolated instance of the apparent effects that efforts to destroy childen before birth may have upon their characters.

A woman of my acquaintance had been at different times the wife of three husbands. To each

husband she bore several children. The fathers had all been pleased with their first babes; but in each case after one or two had been born, and when another was promised, the husband sought to destroy it by giving the mother medicines for the purpose of emptying the womb. She protested, but was overborne, and accepted the drugs the husband provided. Her life was made unhappy by the husband's insistence on her using these medicines. The attempt at child-murder failed in each case, and the infants came at time. Not one of these children showed the average moral standard of the family of either parent. In neither family had there ever been, so far as I could learn, a criminal taint, a trace of insanity or a suicide; yet one of these children became a forger, another an embezzler, while all were erratic, unstable, and suicidal. In marked contrast to these the other children of the same parents — the children who had been more fortunate in prenatal conditions — were strong intellectually, energetic, upright, and truthful.

The conditions that may influence the devel-

oping child being practically infinite, it is impossible to place one's finger upon any one thing and say, "Herein lies the cause of such or such a defect." I cannot, therefore, claim that the above and other similar cases prove that attempts to produce abortions result, when unsuccessful, in deforming the character of the child; but I can say that such effect has so often followed the attempt mentioned that no mother or father who has any feeling for offspring will dare take so tremendous a risk. Scientifically, it has not been explained how attempts to destroy fœtal life result in these terrible consequences; but I am compelled to believe that they sometimes do so result.

Maternal impressions, or the so-called "marking" of the child *in utero* through some powerful mental impression made upon the mother, usually by the sight of something frightful, have for so long been a subject of traditional belief that science must be bold indeed to attack the faith. Yet, notwithstanding evidence massed in support of the belief, science renders the verdict, "Not

proven." The relation of the effect to its supposed cause is far too inconstant in the matter of maternal impressions to satisfy a science greedy for verifications. No tenable theory points us to nature's method of transferring to the growing fœtus an impression made, for instance, upon the mother's retina. We find no nervous connection between the mother and the child *in utero*. So far as we have yet learned, the blood of the mother is her only medium of communication with her unborn child. And even the blood does not pass directly from the blood vessels of the mother to those of the child. A shocking sight, especially if it be brooded over, and give origin to depressing foreboding, may influence the quality of the mother's blood, and cause nutritive changes in the fœtus; but that such changes will image the frightful object science denies.

I have examined numbers of imbeciles and others with defective mental balance, whose condition seemed to me to be due to a severe mental shock sustained by the mother previous

to their birth. The shocks were such as being caught in a burning building, being subjected to the terror of a battlefield, or the witnessing of some horrible disaster. If I was correct in attributing the mental condition of my patients to these causes, it is easy to explain how the change induced in the mother's blood by the frightful surroundings might have so poisoned the delicate nervous system of the forming child as to permanently modify its growth and development. And this, I believe, rather than any imaging in the body of the child of the object of the mother's fright, will be the result of any severe mental shock she may sustain.

As to insignificant causes of momentary alarm or curious attention,— the sight of a toad, the observation of a hare-lip, a glimpse of a wound,— such occurrences are too common in the lives of pregnant women to permit the belief that they can impress the offspring. Almost any woman bearing a child with a deformity can recall something she has seen that resembled that deformity, because there are few women who do not, during

the nine months of gestation, see many startling things. Few children would escape deformity if they mirrored what the mother sees during pregnancy. The source of harm occasioned by the superstitious belief in "markings" is the worry that such belief excites in the mind of the mother. To ignore confidently any suspicion of injury from slight and ephemeral impressions is the way to deprive them of harmful power.

The ancient Greeks used to surround their pregnant women with beautiful works of art, seeking thereby to impress the physical formation and the mental attitude of generations to come. While we refuse credence to the popular theory of "mothers' marks," we acknowledge excellent grounds for this Hellenic custom. Just so surely as unsightly and unpleasant surroundings depress the mind and sap the energies, so do beautiful and inspiring objects tend to waken the activities, and send the blood coursing healthily through the veins. All spiritual uplifting has a powerful physical influence. No mother ever yet made a wise effort to elevate

herself but that the dainty cells that were building the body of her unborn babe praised her effort by renewing their own power. And yet here a warning is due. Too often have I held with conscientious mothers some such dialogue as follows: —

Mother. I protest against the teaching of prenatal influence. Hopes of impressing the unborn child are worse than delusive. I determined to make an artist of my child, and set about it with extravagant faith and zeal. I lived in the midst of beautiful works of art. I contemplated them hourly. I was prepossessed by them. I copied them with enthusiasm. I dreamed of them at night. I never let them escape me. I washed my dishes under the august patronage of Apollo Belvedere, and kneaded my bread while doing homage to Venus de Milo. My son was born in the presence of the famous masters. The result: a nervous, ungovernable lad, a veritable Vandal by nature. And the nearest approach to art which I have been able to coax from him is two paral-

lel lines connecting a triangle and a semicircle, which he triumphantly calls a cat, and which abundantly satisfies his artistic aspirations.

Doctor. And what masterpiece accompanied you in your daily walks during pregnancy, or did nature's charm content your ambition?

Mother. I had no time for a daily walk. I was too busy forming the artist brain of my child to indulge in recreation.

Doctor. Pardon me. You were not building a brain. You were pouring sentiments into a leaky vessel. You were furnishing nature with poor material for building a machine capable of transmuting inward impressions of sublimity into outward expression of beauty. You scorn the relationship between beefsteak and art, but art, nevertheless, represents so much beefsteak, or its equivalent, sublimated into life by the touch of air and sunshine, and glorified into victory over the flesh by submission to the Supreme will. No one inherits either art or music or religion or even morality, but only the type of brain, capable, when properly developed, of feeling and

expressing these. Let the instrument be built strong and true, then Nature will not scorn to trust to it her sweetest dreams of beauty. Artists are not born, nor are pickpockets; but deft and agile fingers are the accompaniments of certain types of brains, and, to what use such fingers shall be put, training, and the owner's capacity for feeling, must determine.

Some one has said that to live among beautiful surroundings and make ugly things is more injurious than to live in the midst of ugly surroundings and make beautiful things, because what we do affects us more than what is done to us. This is no doubt true; and yet few of us have the strength to go on making beautiful things amidst ugly surroundings. It takes splendid courage and tenacious will not to fall to the level of the base things we habitually see. On the other hand, the unconscious exhilaration, the elevating and revivifying influence, received from great minds as they dwell with us in their works, draw us eventually upward, and are good for unborn generations. They help us to make

beautiful things, even beautiful children. But no surroundings, however desirable, can take the place of building material for the growing body, though they may help to determine in some degree the trick of form acquired by that material.

Years ago there lived in Massachusetts a boy whose brutal instincts led him to commit horrible crimes of a bloody nature. He gloated over sights of blood and of suffering. Inquiry revealed the fact that during his gestation his mother had been an attendant in a blood-cure establishment. It had been her duty to catch the warm blood of slaughtered animals, and give it to patients to drink. The case of this boy would certainly seem to argue strongly in favor of the mental impression of the fœtus by the mother's surroundings. But, when it is considered that the sensibilities of any woman who could voluntarily engage in such work must have been extremely blunt, and her sympathies correspondingly undeveloped, it is easy to believe that she might have given birth to such a child under any circum-

stances. He might inherit her moral deficiencies and lack of sympathy, while his intellect was too weak to impress upon him the necessity for controlling evil impulses. A deficient sympathy converts the ordinary childish love of mischief into the more exciting crimes.

There is no doubt that children are more impressed with what mothers *are* than with what they *see* or *do*. Some one has said that "the best thing about us is our admiration of good." If so, the mother who lives in a hovel, and admires goodness and beauty, will give to the world a more upright and artistic soul than will she who lives in grandeur, and cares only for external appearances.

The mother who wears herself out in trying to impress her child, and who becomes over-anxious, over-worried, and "nervous" lest she fail in some motherly duty, is the woman who is sure to fail. A "mother's duty" hangs like a millstone about the necks of some women, dragging them to a despondency in which every duty is drowned. Sometimes the first duty is to forget

all duties except those of health and happiness.

While it may be true that —

> "God hates your sneakin' creturs who believe
> He'll settle things they run away and leave,"

yet he certainly punishes more severely those who have beliefs and "believe them too hard," and consequently feel bound to make the world go right, and nag and fret themselves to despair while the world is "jest goin' on the same,— calm as a clock and never carin'."

We despise the selfish indifference to which nothing but public opinion appeals, and which not even public opinion can lash into more than a languid condemnation of evil; but we admire the sturdy, sympathetic heart which sets itself wisely to ignore the evils it cannot help, and husbands its strength for the day when it may hope by force of accumulated good to overcome evil. We love those who, beaten in the game, imitate the behavior of the victorious.

As lovers of our country we look eagerly

for the strong women, the self-conquerors, no grudgers of effort or of pain, who shall count it their highest glory to rise above cowardice, and enshrine their courage in the sane and never-surrendering souls of children who shall one day guide our republic to a glorious destiny.

> "To dry one's eyes and laugh at a fall,
> And, baffled, get up and begin again," —

that way lies victory.

In reviewing the subject of prenatal influences other than heredity, let emphasis be placed upon the following points: —

The fœtus must receive all its nourishment, all its building material, from the mother's blood. Impurities, or poisons, in that fluid must affect the development of the child. Poisons may occur in the blood from (1) undigested food, the result of over-indulgence or of unwise selection of food; (2) from the undue retention of waste matter in the body through inactivity of the bowels, the kidneys, the skin, or the lungs, or through failure to take suitable exercise; (3) from lack of proper

purification of the blood because of insufficient air or limited breathing capacity; (4) from changes induced in the blood by depressing emotions and passions, especially by fear and anger.

The pregnant woman, therefore, should avoid all excesses; should eat what she herself best thrives upon and most thoroughly digests, and, generally speaking, what she is accustomed to; should keep well open all the channels for ridding the body of waste matter; should supply the lungs freely with fresh air, and live as far as possible in the sunshine; should rise above the worries and irritating and wearing passions, remembering the prize that is set before her,—

"Never doubting clouds will break,
Never dreaming, though right be worsted, wrong will triumph,
Holding that we fall to rise, are baffled to fight better,
Sleep to wake."

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